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there and returned enthusiastic regarding the advantages of Montego Bay as compared with Port Antonio, Kingston and the Tortugas, where one or another of them had previously worked.

Barring the necessary expense of the long sea voyage, a temporary or a permanent laboratory could be opened at Montego Bay with very small outlay and economically maintained, since labor and the necessities of life produced in the island are cheap and readily obtained. While suitable buildings are few, concrete block construction there has been demonstrated a success by the American consul, so that a permanent laboratory might be rapidly constructed.

E. A. ANDREWS

*THE INTERNATIONAL CONGRESS OF RADIOLOGY AND ELECTRICITY, BRUSSELS, SEPTEMBER 13-15, 1910*

UP to the present time two congresses of radiology have been held, the first in Liège, 1905, and the second at Brussels during the past autumn. The second International Congress of Radiology and Electricity opened on September 13 with a large attendance and it was somewhat surprising that subjects so relatively modern as those to which the congress was devoted should have attracted so many interested workers in these special fields. The attendance during the congress approached closely to five hundred and much interest and enthusiasm was shown by those who took part in the many meetings.

Participants in the congress began arriving in Brussels as early as the tenth and at the first formal gathering, a reception held at the Bourse on the evening of the twelfth, the number present had already attained considerable proportions. Many notable scientists from all parts of the world were there, including Mme. Curie, Rutherford, Soddy, Arrhenius, Rieke, Exner, St. Meyer, Rigi, Hahn, Du Bois, Goldstein and others, and in fact the congress was particularly conspicuous in the relatively large number of promi-

nent workers in radiology and electricity that attended. The work of the congress began on Tuesday, September 13, with a meeting at the Palais des Fêtes in the grounds of the exposition, where Professor de Heen, the president, delivered an address, and a number of details in connection with the organization were arranged.

In the afternoon of the same day a very interesting meeting was held in the buildings of the university in which the problems of the nomenclature and standards were discussed. The proceedings were begun by Professor Rutherford, who stated that he had recently compared, by the  $\gamma$ -ray method, the radium standards employed in the leading laboratories of several different countries and had observed very considerable differences, amounting in some cases to 20 per cent., between them. He pointed out the importance of a uniform, international standard by which the results and experiments of workers in all parts of the world might be brought into accord. As the subject of radioactivity had reached a stage of development where accurate, quantitative measurements and comparisons are being constantly made, and as certain radioactive quantities, such as the number of  $\alpha$  particles emitted by one gram of radium, the volume of the emanation produced, and the heating effect, can now be determined with considerable precision, it is highly desirable that the necessary information as to the exact amount of radium in any given specimen of the substance should be definitely and readily determinable by different workers. It was therefore suggested that a specimen of the purest obtainable salt of radium should be prepared and accepted as an international standard and that facilities be afforded by which all workers in the science might be able to express their results in terms of that standard. The subject was generally discussed and it was finally decided that a committee, to be appointed by Professor Rutherford and Mme. Curie, should be formed and that this committee should consider the special needs in the matter and determine the conditions under which the standard should

be prepared and preserved. After some deliberation the committee was announced and consisted of Mme. Curie and M. Debierne, for France, Professors Rutherford and Soddy for Great Britain, Professor Geitel and Dr. Hahn for Germany, Professors St. Meyer and von Schweidler for Austria, Professor Boltwood for the United States and Professor Eve for Canada. It is probable that representatives of other countries who are willing to assist in the work will be added later. An address was then given by Mme. Curie on the subject of her recent experiments on the preparation of metallic radium. No formal action was taken on the subject of nomenclature, but it was agreed that the present system of nomenclature, though far from perfect, was to be preferred to a possibly more rational system which would involve a general change in the names now given to the radioactive substances and would lead to much confusion, for which the advantages obtained would scarcely compensate. The present system affords opportunities for including new products which may be later discovered. Thus, if future investigation should prove that the product radium C is complex and consists of several separate substances, these can be called radium C<sub>1</sub>, C<sub>2</sub>, etc., and the term radium C can be retained for the mixture of the several separate products which normally occur together. It was also suggested that the term "half-value period" should be used to express the time required for any given radioactive product to become half transformed into other substances and that the expression "active deposit" should be used in place of the terms "induced" and "excited" activity. These proposals were received with general approval.

On the following day the congress met in three sections in which a large number of interesting papers on the physical and medical aspects of radiology were presented. On the last day so many important papers remained to be read that it became necessary to subdivide the meetings still further and a separate section was formed for the consideration of purely radioactive questions. Unfortu-

nately, the number of papers were so great that by the system under which the meetings were conducted, insufficient time was available for the proper presentation of a large number of papers. In fact the general arrangements for the meetings were not altogether satisfactory and some dissatisfaction was expressed at the close at the way in which the affairs had been managed. From the standpoint of general usefulness, however, the congress was a great success as it afforded an excellent opportunity to all who attended to become acquainted with other workers in their own special lines. The arrangements for the time and place of the next congress were placed in the hands of an international committee and it is to be hoped that another gathering can be effected in the near future.

The International Committee on Standards reported at one of the last meetings and its recommendations were formally adopted. The substance of the report was as follows:

1. Mme. Curie has kindly agreed for the purposes of the standard to prepare a quantity of the purest obtainable anhydrous radium chloride containing about 20 milligrams of radium (element).

2. When the committee has reimbursed Mme. Curie for the cost of the radium standard, this will come under the control of the committee and will be used only for the measurement and comparisons of secondary standards by means of the  $\gamma$ -rays. The original standard is to be suitably preserved and deposited in Paris.

3. Through the committee and at its discretion national scientific laboratories and bureaus of standards willing to pay the costs are to be provided with certified secondary standards.

4. By such methods as, after due consideration, meet with the approval of the committee smaller subsidiary standards are to be prepared for distribution.

5. As radium emanation is now so generally used in scientific investigations, the committee considers the adoption of a unit for the measurement of the amounts of radium emanation desirable. The committee recom-

mends that the name "Curie" be given to the quantity or mass of emanation in equilibrium with one gram of radium (element). The millicurie would thus be the amount of emanation in equilibrium with one milligram of radium.

6. The question of proposing special names for units of measurement of minute quantities of radium and its emanation is under consideration, but no definite conclusions have as yet been reached.

7. As some members of the committee are not present at the Brussels Congress, and as it has not been possible to obtain information as to their views on these questions, the recommendations here made are not necessarily final. The committee reserves the power to modify them if on further consideration this appears to be desirable.

The preparation of a standard specimen of a pure radium salt is thus assured. The committee was fully agreed that by placing the matter in the hands of Mme. Curie the most satisfactory and trustworthy results could be attained. Mme. Curie has accepted the full responsibility and this portion of the work will be entirely under her personal charge. The methods which will be used by her are left entirely to her discretion. It will be necessary for the committee to approach their several governments or the scientific societies of the different countries interested to secure the funds necessary to defray the cost of the primary standard, which at the present price of radium will probably be about \$2,500. It may at first sight appear that the amount of radium in the primary standard, viz., about 20 mg., is unnecessarily large, but it was pointed out by Mme. Curie that the accurate weighing of quantities less than the amount mentioned of such a relatively unstable salt as anhydrous radium chloride could not be satisfactorily accomplished. The later or secondary standards will be calibrated by comparison with the primary standard, making use of the  $\gamma$  radiation emitted by the radium salts. It will probably be possible to do this satisfactorily if the secondary standards contain a somewhat smaller amount of radium

than the primary. It is anticipated that about 10 milligrams of radium will be a sufficient amount for a secondary standard. These secondary standards will be compared as stated with the primary and also with one another, before their distribution, and it will thus be possible for each country to have in its possession, and at its disposal, one of the secondary standards which may be used for the measurement and certification of quantities of radium when desired. The advantages of this arrangement would seem to be clearly apparent. Not only will it be possible for the scientific results obtained in the subject of radioactivity in different countries to be brought into complete accord, but individuals interested in either the sale or purchase of specimens of radium salts can then be able to obtain trustworthy data as to the amounts of radium in the specimens involved in the transaction. Great uncertainty has existed in the past in the latter cases. Many people have made purchases at high prices only to discover later that the radium salts which they had bought were far from pure. As probably more than \$500,000 worth of radium preparations have already been sold in this country it will be seen that some definite standard of quality and value is imperative for the protection of all concerned.

The problem of the preparation of small substandards containing one or two milligrams of radium, suitable for the use of most scientific laboratories, is one of the most difficult which the committee has to consider. By means of the  $\gamma$  radiation it is not difficult, with proper precautions, to compare approximately equal quantities of radium with an error of considerably less than one per cent. But when the amounts of radium to be compared differ by a ratio of ten to one the problem is much more complicated. As attention will now be devoted to this matter, it is probable, however, that methods will be devised for conducting comparisons of this sort with the degree of accuracy required and to calibrate the smaller substandards by direct comparison with the primary standard or, at all events, with the national standards of approxi-

mately ten milligrams or so. A further matter which has to be considered is the preparation and distribution of extremely dilute solutions of radium salts. For many scientific purposes, such as the determination of the radioactivity of natural waters and rocks, standard solutions of radium containing a definite, known amount of radium per cubic centimeter are frequently required. The committee proposes later to have prepared under its direction standard solutions of this kind, the strengths of which are known in terms of the primary standard. It will probably be some time before these solutions are ready for distribution, and as it may be of considerable assistance to workers in radioactivity to have some working standard for their present uses, the writer will be glad to furnish to those who may now require it small quantities of the solution prepared by Eve, Rutherford and Boltwood.<sup>1</sup> The strength of this solution is accurately known in terms of the radium standard in the possession of Professor Rutherford. When the new international standard has been prepared, the Rutherford standard will be compared with this, and any results obtained by the use of the present solution can then be corrected in terms of the international standard.

It is to be hoped that the International Radium Standards Committee, in its efforts to place radioactive measurements on the same accurate basis as electrical and other measurements, will be supported financially by the governments of the countries represented. All questions with regard to the international radium standard should be addressed to Professor Stefan Meyer, the secretary of the International Committee, Institut für Radiumforschung, Waisenhausgasse 3, Vienna IX., Austria.

BERTRAM B. BOLTWOOD

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THE CONVOCATION WEEK MEETING OF  
THE AMERICAN ASSOCIATION FOR THE  
ADVANCEMENT OF SCIENCE AND  
AFFILIATED SOCIETIES

THE sixty-second annual meeting of the American Association will be held in Minne-

<sup>1</sup> *Am. Jour. Sci.* (4), 22, 1, 1906.

apolis from Tuesday, December 27, to Saturday, December 31. The first general session will occur on Tuesday evening in connection with the president's address, instead of in the morning, as has been the custom. This is made desirable by the fact that registration is a day later than usual. Following the president's address, a reception will be held in the parlors of the Hotel Radisson, the headquarters for the meeting. On Wednesday evening, a public lecture will be given in Saint Paul, complimentary to the citizens of that city, and on Thursday evening a similar complimentary lecture to the people of Minneapolis. The public meetings of Tuesday and Thursday will be held in the auditorium of the First Baptist Church, 10th Street and Harmon Place, three blocks from the Hotel Radisson. A reception to visiting ladies will be tendered by the Woman's Club on Thursday afternoon.

All sections, together with the affiliated societies, will hold their meetings at the University of Minnesota. By request, the sessions of certain sections will be held at the College of Agriculture during one day of the meeting. Dinners, smokers and other social functions will be given in the Hotel Radisson or in the rooms of the Minneapolis Commercial Club, which are in the same building. The Commercial Club has arranged to furnish visitor's cards to members as they register, and the club rooms will be used as social headquarters for the meeting. Luncheons will be furnished on the university campus during the days of the meeting.

It is probable that railroad rates of one and a third fare will be granted from eastern and southern points to Chicago. In the middle west, where a two-cent fare is almost universally in effect, there is no reduction. It should be noted that the round-trip fare from points east of Chicago will be at the rate of one and a third on the three-cent basis.

Secretaries of sections and of affiliated societies who desire to make reservations for dinners or smokers or who wish to have special facilities provided for meetings should write the secretary of the local committee, Frederic